
Public Meeting with NEI and Industry “An Optional, Risk-Informed Approach For Resolution of the PWR Sump Blockage Issue (GSI-191)”



Presenters

Mark G. Kowal, 301-415-1663
Donald Harrison, 301-415-3587
Matthew Mitchell, 301-415-3303

Rockville, MD
May 25, 2004

Purpose of Meeting

- Continue discussions between the staff, NEI and industry regarding a risk-informed option for resolving GSI-191
 - Discuss proposed methodologies and approaches
 - Discuss the path forward for a risk-informed approach
 - Discuss schedule and milestones
 - Obtain stakeholder comments

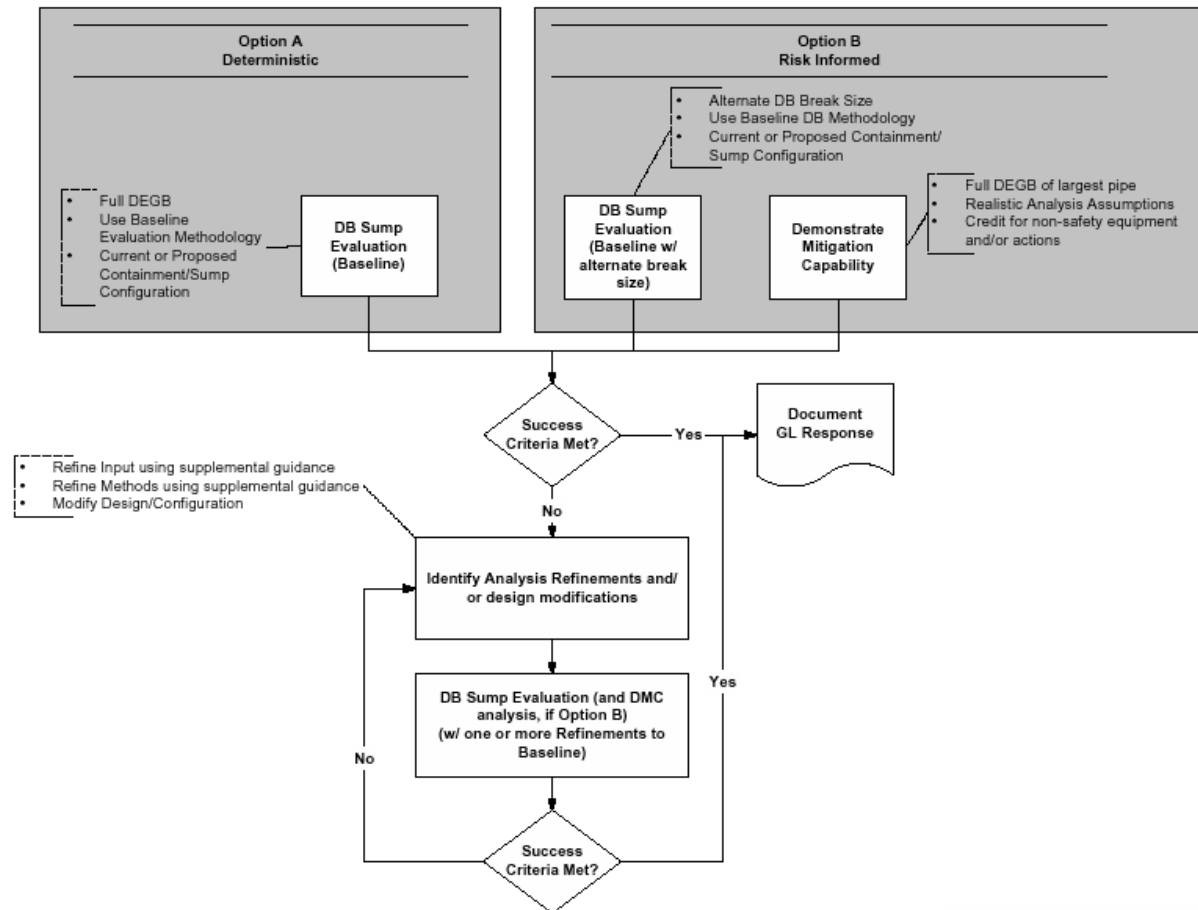
Motivation

- The NRC recognizes that PRA has evolved to the point that it can be used increasingly as an effective tool in regulatory decisionmaking.
- A risk-informed resolution option for GSI-191 will result in more efficient use of agency and licensee resources. It will also enhance the NRC's ability to make technically sound decisions to support the safe operation of a nuclear power plant.
- NRC letter to NEI - dated March 4, 2004
 - 'the NRC staff plans to discuss, in public meetings, the use of current or planned work to risk-inform 10 CFR 50.46 as a suitable technical basis for defining a spectrum of break sizes for debris generation and containment sump strainer performance'
- March 23 - 24 public meeting on NEI Evaluation Guidelines
 - NEI and industry proposal of Option B - Alternate design-basis break size

Motivation

- The staff's desire to promptly implement a realistic plan to resolve the PWR sump issue
- Certain elements of a risk-informed approach could provide additional insights to the ongoing 10 CFR 50.46 rulemaking effort

NEI Proposal - Evaluation Guidance



March 15, 2003

Possible Risk-Informed Approach

- NRC Staff could consider a risk-informed exemption process:
 - Plant-Specific risk-informed exemptions in accordance with 10 CFR 50.12
 - Exemptions from 10 CFR 50.46 (c)(1) - design-basis loss-of-coolant accident equivalent in size to a double-ended guillotine break of the largest pipe in the reactor coolant system
 - Exemption applies only for demonstrating that the requirements of 10 CFR 50.46 (b)(5) are satisfied - Debris generation for Long Term Cooling
- Technical basis
 - In accordance with Regulatory Guide 1.174, “An Approach for Using Probabilistic Risk Assessment in Risk-Informed Decisions on Plant-Specific Changes to the Licensing Basis,” and NUREG-0800, Standard Review Plan Chapter 19
 - For guidance on addressing PRA technical adequacy for the risk-informed exemption, licensees may want to consider elements of Regulatory Guide 1.200, “An Approach for Determining the Technical Adequacy of Probabilistic Risk Assessment Results for Risk-Informed Activities,” and NUREG-0800 Chapter 19.1

Possible Risk-Informed Approach

- Technical basis (continued)

- Design-basis, deterministic analyses necessary to verify compliance with 10 CFR 50.46 (b)(5) for break sizes up through a selected break size that may be less than a double-ended guillotine break of the largest pipe in the reactor coolant system
- Ensure mitigative capability up through the double-ended guillotine break of the largest pipe in the reactor coolant system:
 - Define and satisfy acceptance criteria
 - Functional reliability of necessary equipment
 - Overly conservative, design-basis assumptions would not be necessary
 - Special treatment of equipment necessary to mitigate would be acceptable

- NEI Evaluation Guidelines

- Process and approach would be included in industry evaluation guidelines
- Evaluation guidelines would include a 'template' for licensees to follow
- Approach would be endorsed by the staff as part of evaluation guidelines safety evaluation report
- NRC staff would review plant-specific exemption requests

Break Size Selection

- Break size selection for design-basis and 'realistic' analyses for debris generation (application to 10 CFR 50.46 (b)(5) only)
 - NOT REDEFINING THE DESIGN-BASIS LOSS-OF-COOLANT-ACCIDENT BREAK SIZE
 - All PWR reactor coolant system auxiliary piping up to and including a double-ended guillotine break of any of these lines -design basis rules apply
 - Reactor coolant system main loop piping (hot, cold and crossover piping) up to a size equivalent to the area of a double-ended guillotine break of the plant's largest auxiliary piping - design basis rules apply
 - Breaks in the reactor coolant system main loop piping (hot, cold and crossover piping) greater than the above size, and up to the double-ended rupture of the largest pipe in the reactor coolant system - ensure mitigative capability for these breaks
- Basis
 - Double-ended guillotine breaks in auxiliary piping cannot currently be ruled-out
 - Recognizes that double-ended guillotine breaks are less likely in more robust reactor coolant system main loop piping

Risk-Informed Approach Used to Evaluate Acceptability

- Demonstrate Regulatory Guide 1.174 acceptance criteria are satisfied for full range of break sizes (up through DEGB of largest pipe in the RCS)
 - Δ Core damage frequency and Δ large early release fraction calculations
 - Defense-in-depth
 - Safety margins
- Δ Risk calculation between current sump conditions (with credit for modifications and/or crediting non-safety equipment) versus sump performance under intended design capability
- PRA quality requirements
- Frequency considerations
 - Perform Δ risk calculation using plant-specific large break LOCA frequency
 - Perform sensitivity study using NUREG-1150 large break LOCA frequency
- Condition the exemption - licensee must validate results are consistent with final expert elicitation results

Milestones

- Define risk-informed approach - May 2004
- Public meeting - May 2004
- SECY Information Paper to Commission - June 2004
- Receipt of NEI methodology - TBD
- Staff review of NEI proposed risk-informed guidance - TBD
- Target date for plant specific exemption requests - TBD